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On raised peat-bogs in New Brunswick.

W. F. GANONG.

In certain places near the sea-coast of Charlotte and St. John counties in the Province of New Brunswick there occur several large peat bogs, composed of the purest *Sphagnum*, which have their centers raised many feet above their margins. Such raised bogs must be exceedingly rare; indeed, Professor W. G. Farlow tells me that he has heard of but one other instance, which was in the case of a raised bog in Sweden described in a botanical journal some years ago. These in New Brunswick then must have a special botanical interest.

These bogs having come of late locally into notice for reasons to be referred to below, the present writer, who like many another botanist enjoys in his native place a reputation for omniscience in matters botanical, was called upon last summer to explain their origin. Not being able to do so, he found his natural and securest refuge in the usual resort in such cases, an habitual expression of scepticism (in this case nearly as much real as assumed) as to their very existence. All such refuge, however, was closed to him when, in August last, he, that is to say I, made a visit to one of them in company with a well-known enthusiast on peat bogs and skilful exponent of other local wonders, Mr. C. E. Boardman, of Milltown, New Brunswick.

The one we visited was near Seely's Cove, in Charlotte county, N. B., some twenty miles in an air line N. E. from Eastport, Maine. This bog lies on the right of the highway as one approaches the coast, and is over a quarter, perhaps half a mile in length. It is relatively narrow, being not more than one-sixth of that distance in breadth, perhaps less. It lies in a general N. and S. direction, nearly parallel, at its upper part at least, with the highway road, and therefore with the high land. It rises gently from the margin all around until it attains a height of about ten feet, when it slopes still more gently, probably four or five feet higher, and then becomes flat topped, and so runs for the above mentioned length. Its section would present about the curve of a loosely strung

bow which bends rather abruptly toward the ends. Its surface is entirely naked and clear of trees and shrubs of any kind with the sole exception of an occasional very much dwarfed blueberry bush; and according to local tradition it has always been so. The same authority, it may be added in passing, says that it is growing in height; basing the statement upon the observation that teams and people at the lower end, which could formerly be seen from the upper, cannot now be so seen, a point not likely to escape notice in a sparsely-settled district where the doings of one's neighbors are of so much moment.

The bog is composed of nearly pure *Sphagnum* of the finest kind, free from all roots and similar impurities and showing not a trace of decay or anything resembling muck. Some few other mosses and lichens occur on the surface, but appear to form no part of the material below. The living material above merges gradually downwards into a clear, odorless, carbonaceous, semi-peat like material, which has been found to have important economic properties dependent upon those qualities. It is soaked with an abundance of water, clear and cold, and hence totally unlike ordinary bog-water. Its clearness was plain to the eye as it flowed from a squeezed handful of the moss, its coldness to the senses, both by its feeling when a hand was thrust into it, and also by the satisfactorily refrigerated condition of the liquid portion of our luncheon which was buried in it for a time to await our return. The bog does not tremble under foot. It is bounded on one side only by high land, and on the other it slopes down and merges into a flat bog of the ordinary kind which is of great extent. The latter presents all the ordinary bog characters, dirty water, muck, trembling places, and a growth of clumps of small spruces and the ordinary ericaceous shrubs; in fact it is the common every-day bog we all know. It is a novel and pleasing experience to walk from the dirty quaking affair up a slope to one so clean and compact.

My guide, with his veracity fully vindicated, was of course triumphant, and he gave me many details as to others, the principal of which he has had the kindness to repeat in a letter. His business during the past two years has taken him over every part of this section of the country; and as he has been specially on the look-out for the bogs, his observations are valuable. In all he knows of sixteen bogs of considerable

size, of this raised character, the areas of which vary from a few up to three hundred acres, the total acreage of all sixteen being estimated at about eleven hundred acres. They vary in height from a few feet up to as much as forty or fifty. They are all comprised within a limit of about thirty miles, between L'Etang Harbor and Musquash; and although a careful search has been made for others in other parts of New Brunswick and in Maine, none has been discovered. They are all near the coast, with only two or three exceptions being within two or three miles of the salt water, only one of them being as far as four miles away. Very few of them have any level bog portion. They are all entirely clear of trees or bushes, and composed of clear, clean Sphagnum. In one or two cases Mr. Boardman has bored to the bottom of the smaller ones and found them underlaid by clean gravel; in other cases the boring apparatus, adapted to go down twelve feet, did not reach bottom, and it brought up in all cases only close clean carbonized peat-moss, with no trace of muck. At Musquash one of the largest, though not a very high bog, is being extensively worked for the moss, which has been found exceedingly valuable as a bedding for horses and cattle. The workings have there gone to a depth of forty-four feet without finding bottom or muck impurities. The great purity, freedom from decay, antiseptic and absorbent powers of the carbonized moss promise to create a local industry of much importance; and practical men are there putting energy and capital into mining and experimenting with it.

Lest my readers, habituated to the appendage of a theory to all statements of facts, should experience a shock by its absence, I hasten to be in the fashion and offer my "theory" of their origin. I can speak personally only of the Seely's Cove bog, but possibly what is true of it may apply to others also. I think its origin and growth are connected with the great prevalence in this region of large, clear, cold springs. In fact there occur a few miles away single springs which are large enough to give origin to large brooks, and the water is invariably very cold and clear. A most famous spring of this character occurs on the line of railway a few miles from St. George and smaller ones are abundant everywhere. The purest water I ever saw, even in New Brunswick, where so many streams are crystal-clear, was in a spring brook within a mile or two of this bog. Now it is noticeable that the upper

end of the bog comes in contact with the high land, and that it is for some distance parallel with it, that it is long and relatively narrow, and that on the side away from the higher land it sinks down to a large bog of the flat kind. I think it extremely probable that a huge cold spring (or a line of them) comes out from the high land at the upper end of the bog, and the water then flows along toward its lower end on the bottom, being soaked up as it goes. The bog then grows and carries up the water sponge-like with it, and when off to one side the influence of the spring diminishes and is finally lost, the ordinary bog conditions begin to prevail. All this is confirmed by the fact of which Mr. Boardman assures me, that there flows out from its lower end a brook of clear, cool water, large enough so that in times past it has turned the wheel of a mill. Water of this character does not flow from common bogs and a spring origin seems necessary to account for it.

One other point remains to be explained. Why are they treeless and shrubless? This I believe to be due to the coldness of the water supplied by the springs. The temperature is too low for the growth of the roots of shrubs or trees. Its coldness has been already referred to; even at a depth of but a few inches this was very marked. It is perhaps, too, a point of importance that the bog bears in greatest profusion the cloud-berry, *Rubus Chamæmorus*; so abundant is it that the inhabitants resort to the bog with pails and gather it in great quantities. This northern plant finds so congenial a home but rarely in these latitudes, and seems to point to the cold conditions prevailing in the bog. I advance this explanation but tentatively. Perhaps some of our botanists who take their outing in that favored region will give it their attention.

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Notes on the flora of the St. Croix region.

E. J. HILL.

(Concluded from p. 113.)

The rest of the time in the St. Croix region was given to the Chesago Lakes, situated a few miles west of Taylor's Falls. Three days of the early part of September were mainly devoted to an examination of the water-plants, or to those of